Comparing On-Premises over Cloud HPC Solutions: New Study Announced by Nor-Tech

MINNEAPOLIS November 27, 2020 Nor-Tech, the leading experts on Linux-based high-performance technology solutions, is promoting a new NASA study on the benefits of on premises over cloud high performance computing. The study concluded: Commercial clouds do not offer a viable, cost approach for replacing in-house HPC resources at NASA. To promote the study, Nor-Tech condensed it into a 3-page article that includes tables summarizing NASA's findings and Nor-Tech's take. The article also includes information about the role Intel's 3rd Gen Xeon Scalable processors play in delivering the kind of cost-effective high performance that cloud services cannot match.

In conducting the study, NASA's High-End Computing Capability (HECC) Application Performance and Productivity (APP) team undertook a performance and cost evaluation comparing three domains: two commercial cloud providers and HECC's in-house resources.

All runs on HECC resources were faster, and sometimes significantly faster, than runs on the most closely matching cloud resources. In all cases, the full cost of running on HECC resources was less than the lowest possible compute-only cost of running on cloud.

Results showed that large applications with tightly coupled communications perform worse on cloud resources than on similar resources at HECC. In addition, per-hour use of cloud resources was more expensive than the full cost of using similar resources at HECC.

Nor-Tech Executive Vice President Jeff Olson said, "We have been able to validate this study through our own anecdotal experience developing HPC solutions and the client feedback we have received for over two decades." Nor-Tech's findings include:

1. The number one consideration is workload. If, as with most HPC systems, the overall workload is more than 80%, Nor-Tech calculated the ROI for on-premises computing to be about nine months.
2. Application software is significantly more expensive than hardware. Cloud providers' fees are usually based on time used--the longer it takes to run in the cloud, the more it costs. So the faster the job solves, the less the software cost for that job.
3. Taking into consideration that lifecycles for on-premises systems are a minimum of three years, there is substantial savings in deploying on-premises over cloud even factoring in ongoing power, cooling, and management costs of on-premises computing.
4. Frequency is the most important factor for performance in HPC computing. Generally, lower core count processors have faster frequencies. Cloud providers use high core count processors to improve overall computing density.
5. Some cloud providers only use high speed Ethernet verses the lower latency InfiniBand typically found in HPC solutions. InfiniBand offers a significant performance advance over Ethernet in many HPC applications.

Nor-Tech, an Intel HPC Data Center Specialist and Intel Platinum Partner, integrates Intel's Xeon Scalable processors into high performance servers and clusters. The many benefits of Intel's new 3rd Gen Xeon Scalable processors that deliver an advantage over cloud include:

- Built-in AI Acceleration: Faster insights from data-intensive workloads with built-in AI acceleration and massive memory capacity
- Trusted Protection: Multilayer security that optimizes service delivery and thwarts malicious exploits
- Enhanced Platform: Hardware-enhanced virtualization across compute, network and storage

These new processors are the next step above the previous-generation 2 to 8-socket processor foundation; designed and built for today's AI-infused, data-intensive workloads.

Nor-Tech's article is available at: https://www.nor-tech.com/wp-content/uploads/2020/11/nor-tech-cloud-v.-on-premises-hpc-intel.pdf

The complete NASA study is available at: https://www.nas.nasa.gov/assets/pdf/papers/NAS_Technical_Report_NAS-2018-01.pdf

Nor-Tech is on CRN's list of the top 40 Data Center Infrastructure Providers along with IBM, Oracle, Dell, and Supermicro and is also a member of Hyperion Research's prestigious HPC Technical Computing Advisory Panel. The company is a complete high performance computer solution provider for 2015 and 2017 Nobel Physics Award-contending/winning projects. Nor-Tech engineers average 20+ years of experience. This strong industry reputation and deep partner relationships also enable the company to be a leading supplier of cost-effective Lenovo desktops, laptops, tablets and Chromebooks to schools and enterprises. All of Nor-Tech's high performance technology is developed by Nor-Tech in Minnesota and supported by Nor-Tech around the world. The company is headquartered in Burnsville, Minn. just outside of Minneapolis. Nor-Tech holds the following contracts: Minnesota State IT, GSA, University of Wisconsin System, and NASA SEWP V.